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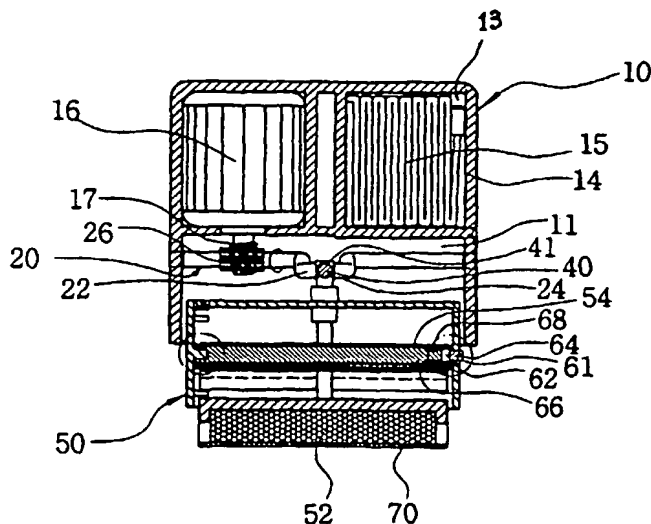
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(54) Title: PORTABLE DEVICE FOR POLISHING CAR



(57) Abstract: The object of this invention is to provide a portable device for polishing cars. In the device, a drive motor (16) having a worm (17) is set in a housing (10), and is operated by electricity supplied from the lighter jack of a car through an electric cord (15). A crankshaft (20) and a corotating shaft (30) are each rotatably held in the housing (10), and each have a crank pin part (22, 32), which is eccentric from the shaft's central axis by 2mm. The crankshaft (20) has a worm gear (26) engaging with the worm (17). A vibrating shaft (40) is coupled to the crank pin parts (22, 32) using bearings (41, 42) provided at both ends thereof. A cloth housing (50) is mounted to the vibrating shaft (40), with a cloth (70) set in the cloth housing and biased downward by a tension unit (52).

WO 02/092405 A1

PORTABLE DEVICE FOR POLISHING CAR

Technical Field

The present invention relates generally to a portable device for polishing cars, and more particularly, to a portable device for polishing cars, which can be operated even when a cloth is strongly pressed against a car, because the device is operated using a vibrating-type mechanism that minimizes load imposed on the device while polishing a car, and which is designed to allow easy replacement of a dirty cloth with a clean cloth during polishing work, and which is designed to prevent wax from being splashed on a worker when polishing a car, thus allowing the worker to work without wearing a protective coat, and which allows the worker to finish polishing a car within a short period of time, and which is easy to use, thus remarkably reducing the cost and the time consumed in polishing work.

Background Art

Generally, cars become covered with dust or dirt while being parked. When cars are covered with dust or dirt, the cars are washed with soapy water at car washes. In the case of frequently washing cars, it causes environmental contamination, in addition to incurring washing cost. Thus, many owner-drivers have coated the surface of a car with wax or polishing agents.

When cars are coated with wax or polishing agents in this way, drivers have only to lightly brush dust or dirt covering the cars using a duster so as to remove dust or dirt from the cars.

In order to coat cars with wax or polishing agents, the polishing work is performed by repeatedly rubbing a car with a cloth or performed using a cloth-covered disc which is rotated by a motor, after applying a small quantity of polishing agent on several spots of the car.

However, since it takes much time and it is hard for a driver to polish a

car, the driver usually refers the polishing work using the cloth-covered disc rotated by the motor, to a car service center, thereby owner-drivers incurring a heavy burden of expense.

5 In order to reduce the cost of polishing work, a driver may purchase a portable device for polishing cars and polish a car for himself. When it is required to polish a car, a worker firstly applies wax on the surface of the car and rubs the car to obtain a desired luster. In the case of rubbing the car coated with the wax using the device, alcohol contained in the wax is volatilized and the residue of wax remains on the car.

10 At this time, in order to remove the residue of wax from the car and polish the car, a worker has to strongly press the device such that the cloth of the polishing device comes into close contact with the car, and has to strongly rub the car.

15 However, since the conventional portable device for polishing cars is formed by covering a disc with a cloth and is operated using a rotating-type mechanism, the device is overloaded and stopped when the cloth is in close contact with the surface of a car, so the polishing work may be frequently discontinued.

In addition, when the polishing operation is performed using such a rotating-type mechanism, wax may be splashed on a worker due to a centrifugal
20 force of the rotating disc, so it is necessary for a worker to wear a protective coat.

Since the polishing work using the conventional device is carried out by rotating the cloth-covered disc by the motor, the cloth disc becomes frequently dirty. Thus, this device has a problem that it is complicated to polish a car and it increases in the cost of polishing, because a dirty cloth has to be frequently
25 replaced with a clean one.

Further, sections of the cloth disc rotated by the motor are different from each other in their torques. That is, the outermost section of the cloth disc has a large torque, but the central section of the cloth disc has a small torque. So, it is easy to polish a part of the car which is in contact with the outermost section
30 having such large torque, but it is difficult to polish the part of the car which is in

contact with the central section having such small torque. Thus, a worker must polish a car while moving the motored disc along a large circle, so it is difficult, exhausting, and inefficient, as well as taking much time, to polish a car.

Disclosure of the Invention

5 Accordingly, the present invention has been made keeping in mind the above problems occurring in the prior art, and an object of the present invention is to provide a portable device for polishing cars, which can be operated even when a cloth is strongly pressed against a car, because the device is operated using a vibrating-type mechanism that minimizes load imposed on the device while
10 polishing a car, and which is designed to allow easy replacement of a dirty cloth with a clean cloth during polishing work, and which is designed to prevent wax from being splashed on a worker when polishing a car, thus allowing the worker to work without wearing a protective coat, and which allows the worker to finish polishing a car within a short period of time, and which is easy to use, thus
15 remarkably reducing the cost and the time consumed in polishing work.

 In order to accomplish the above object, the present invention provides a portable device for polishing cars, comprising a housing consisting of a drive motor having a worm, interiorly set at an upper portion of the housing and operated by electricity supplied from a lighter jack of a car through an electric cord
20 received in a casing, said casing provided at a position adjacent to the drive motor, with a door being formed on the housing to selectively open the casing, a handle exteriorly provided at the upper portion of the housing, and an operating chamber defined at the lower portion of the housing; a crankshaft rotatably held in the housing and consisting of a worm gear rotatably engaging with the worm of the
25 drive motor, and a first crank pin part provided on a center of the crankshaft and being eccentric from a central axis of the crankshaft by 2mm; a corotating shaft rotatably held in the housing, and set at the same height as that of the crankshaft in such a way as to be spaced apart from the crankshaft, and having a second crank

pin part provided on the center of the corotating shaft and being eccentric from a central axis of the corotating shaft by 2mm; a vibrating shaft coupled to both the first and second crank pin parts using bearings provided at both ends thereof; and a cloth housing mounted to the vibrating shaft, and consisting of two cloth winding shafts each having a cloth winding reel, with a cloth wound on the two winding
5 reels at both ends thereof in the cloth housing and biased downward by a tension unit at its released part positioned between the two shafts.

In this invention, the crank pin part of the crankshaft is designed such that the first end is provided with a locking projection and the second end thereof is
10 provided with a locking slot, such that the locking projection and locking slot are engaged with each other in a force fitting method.

Further, according to this invention, each of the winding shafts comprises a movable bearing designed such that the first end has a rectangular shape in its cross section and is inwardly recessed on its end surface to form an operating
15 recess, and the second end has an axial opening, with inward locking teeth formed on an inner surface of an end of the opening; a support shaft designed such that the first end is rotatably supported at a first sidewall of the cloth housing and the second end is slidably inserted into the opening, with outward locking teeth being formed on an outer surface of the second end of the support shaft to rotatably
20 engage with the inward locking teeth; and a spring interposed between the movable bearing and the support shaft for normally biasing the bearing in a direction away from the support shaft to allow the bearing to be supported at a second sidewall opposite to the first sidewall of the cloth housing.

Brief Description of the Drawings

25 The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view showing a portable device for polishing cars

according to the preferred embodiment of this invention;

FIG. 2a is a sectional view of the portable device according to the preferred embodiment of this invention, when a vibrating shaft moves a cloth housing to a highest level;

5 FIG. 2b is a sectional view of the portable device according to the preferred embodiment of this invention, when the vibrating shaft moves the cloth housing to the right;

10 FIG. 2c is a sectional view of the portable device according to the preferred embodiment of this invention, when the vibrating shaft moves the cloth housing to a lowest level;

FIG. 2d is a sectional view of the portable device according to the preferred embodiment of this invention, when the vibrating shaft moves the cloth housing to the left;

15 FIG. 3 is a sectional view of the device according to the preferred embodiment of this invention;

FIG. 4 is a front view showing a crankshaft included in the device according to the preferred embodiment of this invention, with the crankshaft being disassembled;

20 FIG. 5a is a partial sectional view showing a cloth winding shaft included in the device according to the preferred embodiment of this invention, with a movable bearing set in the sidewall of the cloth housing;

FIG. 5b is an enlarged transverse sectional view of the cloth winding shaft, with the movable bearing set in the sidewall of the cloth housing;

25 FIG. 6a is a partial sectional view showing the winding shaft according to the preferred embodiment, with the movable bearing retracted from the sidewall of the cloth housing;

FIG. 6b is an enlarged transverse sectional view of the cloth winding shaft, with the movable bearing retracted from the sidewall of the cloth housing;

30 FIG. 7a is a sectional view showing the end of the cloth winding shaft held in the cloth housing at a position opposite to the movable bearing according to

the preferred embodiment of this invention; and

FIG. 7b is a transverse sectional view of FIG. 7a.

Best Mode for Carrying Out the Invention

Reference should now be made to the drawings, in which the same
5 reference numerals are used throughout the different drawings to designate the same or similar components.

FIG. 1 is a perspective view showing a portable device for polishing cars according to the preferred embodiment of this invention. FIG. 2a is a sectional view of the portable device according to the preferred embodiment of this
10 invention, when a vibrating shaft moves a cloth housing to a highest level. FIG. 2b is a sectional view of the portable device according to the preferred embodiment of this invention, when the vibrating shaft moves the cloth housing to the right. FIG. 2c is a sectional view of the portable device according to the preferred embodiment of this invention, when the vibrating shaft moves the cloth
15 housing to a lowest level. FIG. 2d is a sectional view of the portable device according to the preferred embodiment of this invention, when the vibrating shaft moves the cloth housing to the left. FIG. 3 is a sectional view of the device according to the preferred embodiment of this invention.

According to this invention, the portable device for polishing cars
20 includes a housing 10, a crankshaft 20, a corotating shaft 30, a vibrating shaft 40, two cloth winding shafts 60 and 60', and a cloth housing 50.

The housing 10 is made of synthetic resin, and is provided on its upper portion with a handle 12 to allow a user to freely carry the device to a desired place. A drive motor 16 having a worm 17 is interiorly set at the upper portion of
25 the housing 10. A casing 13 is set at a position adjacent to the drive motor 16, and receives an electric cord 15 therein. In this case, the drive motor 16 is operated by electricity supplied from the lighter jack (not shown) of a car through the electric cord 15. A door 14 is formed on the housing 10 to selectively open

the casing 13. An operating chamber 11 is defined at a lower portion of the housing 10 to receive several components which carry out a sophisticated vibrating movement as will be described in detail later herein.

FIG. 4 is a front view showing the crankshaft included in the portable device according to the preferred embodiment of this invention, with the crankshaft being disassembled.

The crankshaft 20 is made of synthetic resin, and has a worm gear 26 engaging with the worm 17 of the drive motor 16 to rotate along with the worm 17. The crankshaft 20 is divided into two parts by a first crank pin part 22. In this case, one end of the first crank pin part 22 is provided with a locking projection 23, while the other end of the first crank pin part 22 is provided with a locking slot 24, such that both the ends are engaged with each other in a force fitting method. Both ends of the crankshaft 20 are rotatably held in the housing 10.

The corotating shaft 30 is set at the same height as that of the crankshaft 20, and has a second crank pin part 32. The second crank pin part 32 is provided at its both ends with a locking projection (not shown) and a locking slot (not shown), respectively. In this case, the locking projection is forcibly fitted into the locking slot in the same manner as the first crank pin part 22 of the crankshaft 20.

The vibrating shaft 40 is coupled to both the first and second crank pin parts 22 and 32 of the crankshaft 20 and the corotating shaft 30 such that the crankshaft 20 is rotated along with the corotating shaft 30. Bearings 41 and 42 are set in both ends of the vibrating shaft 40 to minimize friction between the vibrating shaft 40 and the crankshaft 20, and between the vibrating shaft 40 and the corotating shaft 30, thus allowing the vibrating shaft 40 to be smoothly rotated.

The cloth housing 50 is mounted to the vibrating shaft 40, and consists of two cloth winding shafts 60 and 60' which have cloth winding reels 54 and 54', respectively. In this case, much cloth is wound around the cloth winding reel 54, while the end of a cloth 70 is fixed to the cloth winding reel 54'. The released part of the cloth 70 positioned between the two shafts 60 and 60' is biased downward by a tension unit 52.

FIG. 5a is a partial sectional view showing a cloth winding shaft included in the device according to the preferred embodiment of this invention, with a movable bearing set in the sidewall of the cloth housing. FIG. 5b is an enlarged transverse sectional view of the cloth winding shaft, with the movable bearing set in the sidewall of the cloth housing. FIG. 6a is a partial sectional view showing the winding shaft according to the preferred embodiment, with the movable bearing retracted from the sidewall of the cloth housing. FIG. 6b is an enlarged transverse sectional view of the cloth winding shaft, with the movable bearing retracted from the sidewall of the cloth housing. FIG. 7a is a sectional view showing the end of the cloth winding shaft held in the cloth housing at a position opposite to the movable bearing according to the preferred embodiment of this invention. FIG. 7b is a transverse sectional view of FIG. 7a.

Each of the cloth winding shafts 60 and 60' has a support shaft 66, a movable bearing 61, and a spring 68. A first end of the support shaft 66 is rotatably supported at a first sidewall of the cloth housing 50. Outward locking teeth 67 are formed on the outer surface of the second end of the support shaft 66.

The movable bearing 61 are designed such that its first end has a rectangular shape in its cross section and is inwardly recessed on its end surface to form an operating recess 64, and its second end has an axial opening 62. In this case, inward locking teeth 63 are formed on the inner surface of an end of the opening 62.

The spring 68 is interposed between the movable bearing 61 and the support shaft 66 for normally biasing the bearing 61 in a direction away from the support shaft 66 to allow the bearing 61 to be supported at a second sidewall opposite to the first sidewall of the cloth housing 50.

The first end of the support shaft 66 of the cloth winding shaft 60' rotatably engages with a locking step 56 which is protruded from the cloth housing 50. A check spring 58 produced in the form of a plate spring is mounted to the locking step 56. A slit 57 is formed on the locking step 56 so as to fix the check spring 58. A plurality of locking teeth 69 are formed on the inner surface of the

winding shaft 60', and engage with the check spring 58 for ensuring one-way rotation of the support shaft 66.

5 The cloth winding reels 54 and 54' each may have an axial slit by cutting the outer surface of the reel to catch the end of the cloth 70 in the same manner as fixing a film in a camera. Alternatively, the cloth winding reels 54 and 54' may be produced in the form on a plate, and one edge thereof is fixed to the winding shaft 60 or 60' and the other edge fixes the end of the end of the cloth 70.

10 The tension unit 52 is made of materials having a predetermined elasticity. The tension unit 52 is preferably made of sponge, but may be produced in the form of a spring-biased plate.

The operation of the portable device for polishing cars according to this invention is as follows.

15 When it is required to polish a car, the door 14 is opened so as to take out the electric cord 15 from the casing 13 provided in the housing 10, and then the device is charged with electricity supplied from the lighter jack (not shown) of a car through the electric cord 15. Thereafter, when a switch 80 is on, the worm 17 of the drive motor 16 is rotated by electricity supplied from the lighter jack of a car through the electric cord 15.

20 When the worm 17 of the drive motor 16 is rotated, the worm gear 26 of the crankshaft 20 engaging with the worm 17 is also rotated to make the crankshaft 20 rotate.

When the crankshaft 20 is rotated, the second crank pin part 32 of the corotating shaft 30 coupled to the first crank pin part 22 of the crankshaft 20 by means of the vibrating shaft 40 is corotated.

25 When the crankshaft 20 is rotated, the first crank pin part 22 is rotated at a position eccentric from the central axis of the crankshaft 20 by 2mm while making the vibrating shaft 40 rotate. At this time, the vibrating shaft 40 is rotated while vibrating in both the vertical and horizontal directions within the range of 4mm.

30 The cloth housing 50 mounted to the vibrating shaft 40 vibrates in the operating chamber 11 of the housing 10 in both the vertical and horizontal

directions within the range of 4mm. At this time, the cloth 70 with the polishing agent received in the cloth housing 50, rapidly rubs the car to polish the car.

In the case of polishing a car using the device according to this invention, a user has only to smear the polishing agent on the cloth 70 and hold the device
5 against the car. Then, the device is vibrated by itself without great effort of the user while rapidly rubbing the car with the released part of the cloth 70 biased downward by the tension unit 52 to polish the car. At this time, the user has only to press the housing 10 against the surface of the car with a small force.

The released part of the cloth 70 biased downward by the tension unit 52
10 received in the cloth housing 50 may become dirty on one surface thereof by repetitive polishing work, so it is difficult to obtain a desired luster. In this case, a user presses the movable bearing 61, which is slightly protruded from the cloth housing 50, of one of the two cloth winding shafts 60 and 60', that is, the winding shaft 60 having much cloth. At this time, the inward locking teeth 63 of the
15 movable bearing 61 is thus disengaged from the outward locking teeth 67 of the support shaft 66 as shown in FIG. 6a, such that the cloth winding shaft 60 is rotatable. Thereafter, the user inserts a tool, such as a screwdriver or a coin, into the operating recess 64' of the movable bearing 61' of the other cloth winding shaft 60', and appropriately rotates the other cloth winding shaft 60'.

20 The dirty part of the cloth 70 is thus wound around the cloth winding reel 54' of the other winding shaft 60' such that the dirty surface of the cloth 70 is directed inward on the reel 54' and the clean surface of the cloth 70 is directed outward on the reel 54' as shown in Fig. 1. At the same time as the winding of the cloth 70 on the reel 54', a desired length of a new part of the cloth 70 is
25 unwound from the cloth winding reel 54 of the winding shaft 60 to be newly positioned under and biased downward by the tension unit 52.

In the case where the released part of the cloth 70 between the two cloth winding shafts 60 and 60' is loosened, the user easily tensions the released part of the cloth 70 by turning the shaft 60' clockwise until the released part of the cloth
30 70 unwound from the reel 54 of the shaft 60 is desirably tensioned by the tension

unit 52.

Upon tensioning the released part of the cloth 70 as described above, the device can effectively perform its car polishing operation.

In the case where the entire cloth 70 is completely unwound from the winding reel 54 of the shaft 60 and wound on the winding reel 54' of the other shaft 60' such that one surface of the entire cloth 70, which becomes dirty due to repetitive polishing work, is directed inward on the reel 54', a user opens the cloth housing 50, and removes the winding reel 54' with the cloth 70 and the empty winding reel 54 from their winding shaft 60' and 60. Thereafter, the winding reel 54' with the cloth 70 engages with the shaft 60, and a new winding reel (not shown) engages with the other shaft 60', prior to holding the free end of the cloth 70 of the reel 54' at the new winding reel of the shaft 60'. Thereafter, the two shafts 60 and 60' are seated at their positions in the housing 50. In such a case, the cloth 70 which is dirty on one surface thereof is wound on the reel 54' of the shaft 60 such that its clean surface is directed outward, so the clean surface of the released part of the cloth 70 unwound from the reel 54' is directed outward. The tension unit 52 in the above state biases the released part of the cloth 70 such that the clean surface of the released part of the cloth 70 is in tight contact with the surface of the car during a car polishing work. Therefore, the device of this invention can use both surfaces of the cloth 70, resulting in double use of the cloth 70.

Industrial Applicability

As described above, the present invention provides a portable device for polishing cars, which is capable of smoothly performing polishing work even when strongly coming into contact with a car, and which allow easy replacement of a dirty cloth with a clean cloth, and which is easy and simple to manipulate, so women drivers can easily use the device, and which is designed to polish a car with a sophisticated vibration, so wax is prevented from being splashed, thus

allowing a user to not wear a protective coat, and easily polishing a car without regard to time and place, therefore remarkably saving cost and time consumed to polish a car.

5 Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

Claims

1. A portable device for polishing cars, comprising:
a housing consisting of:

5 a drive motor having a worm, interiorly set at an upper portion of the housing, and operated by electricity supplied from a lighter jack of a car through an electric cord received in a casing, said casing provided at a position adjacent to the drive motor, with a door being formed on the housing to selectively open the casing;

10 a handle exteriorly provided at the upper portion of the housing; and
an operating chamber defined at a lower portion of the housing;
a crankshaft rotatably held in the housing, and consisting of:
a worm gear rotatably engaging with the worm of said drive motor;
and

15 a first crank pin part provided on a center of the crankshaft and being eccentric from a central axis of the crankshaft by 2mm;

a corotating shaft rotatably held in said housing, and set at the same height as that of the crankshaft in such a way as to be spaced apart from the crankshaft, and having a second crank pin part, said second crank pin part provided on a center of the corotating shaft and being eccentric from a central axis of the corotating shaft by 2mm;

20 a vibrating shaft coupled to both the first and second crank pin parts using bearings provided at both ends thereof; and

a cloth housing mounted to the vibrating shaft, and consisting of two cloth winding shafts each having a cloth winding reel, with a cloth wound on the two winding reels at both ends thereof in the cloth housing and biased downward by a tension unit at a released part thereof positioned between the two shafts.

2. The device according to claim 1, wherein said crank pin part of the crankshaft is designed such that a first end thereof is provided with a locking

projection and a second end thereof is provided with a locking slot, said locking projection and locking slot being engaged with each other in a force fitting method.

5 3. The device according to claim 1, wherein each of said winding shafts comprises:

a movable bearing designed such that a first end thereof has a rectangular shape in its cross section and is inwardly recessed on its end surface to form an operating recess, and a second end thereof has an axial opening, with inward locking teeth formed on an inner surface of an end of said opening;

10 a support shaft designed such that a first end thereof is rotatably supported at the cloth housing and a second end thereof is slidably inserted into said opening, with outward locking teeth being formed on an outer surface of the second end of the support shaft to rotatably engage with the inward locking teeth; and

15 a spring interposed between the movable bearing and the support shaft for normally biasing the bearing in a direction away from the support shaft to allow the bearing to be supported at the cloth housing.

FIG. 1

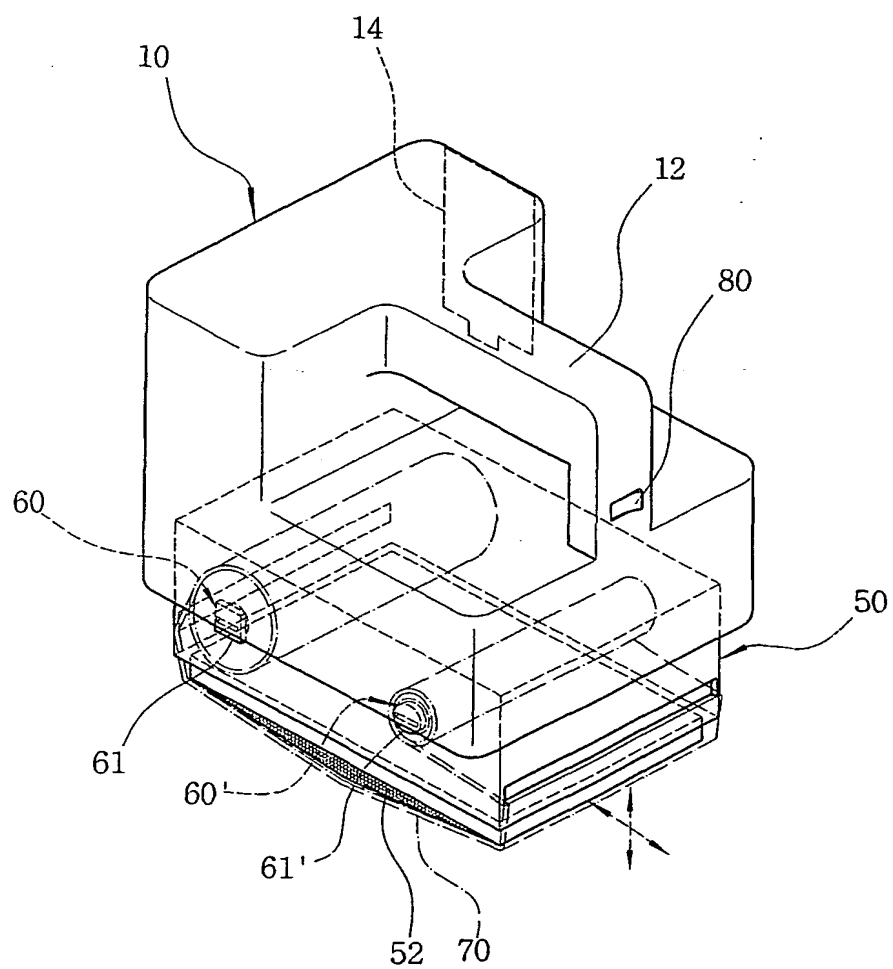


FIG. 2a

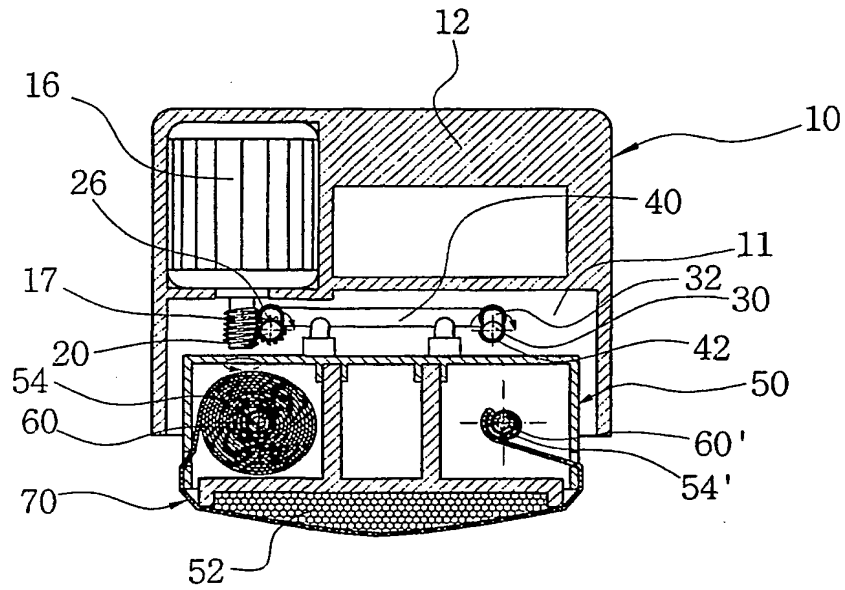


FIG. 2b

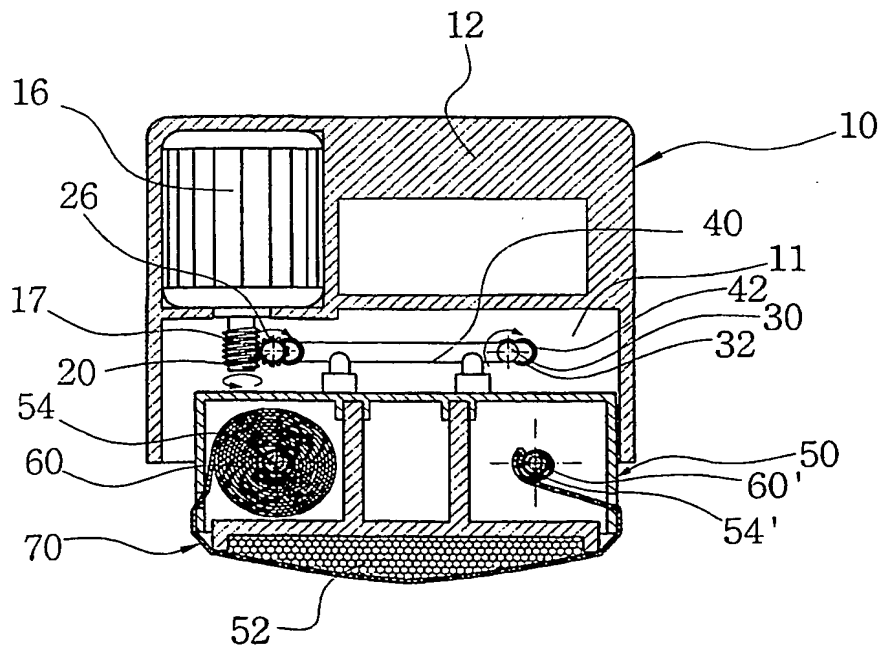


FIG. 2c

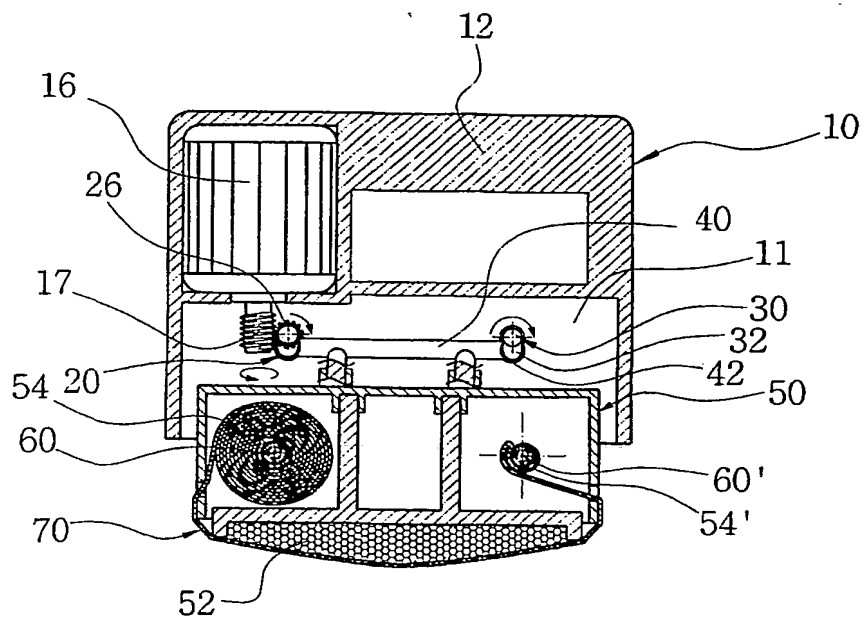


FIG. 2d

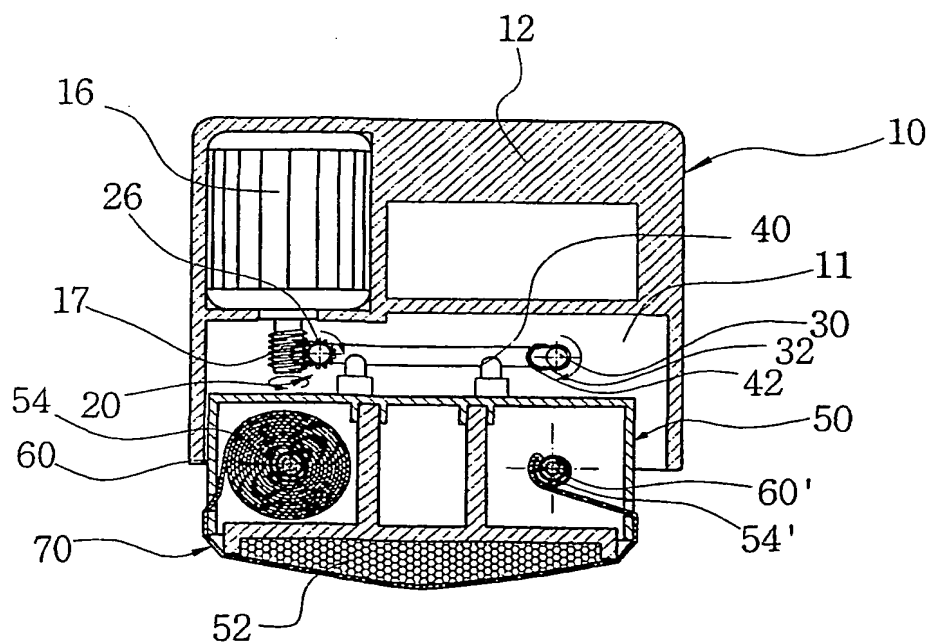


FIG. 3

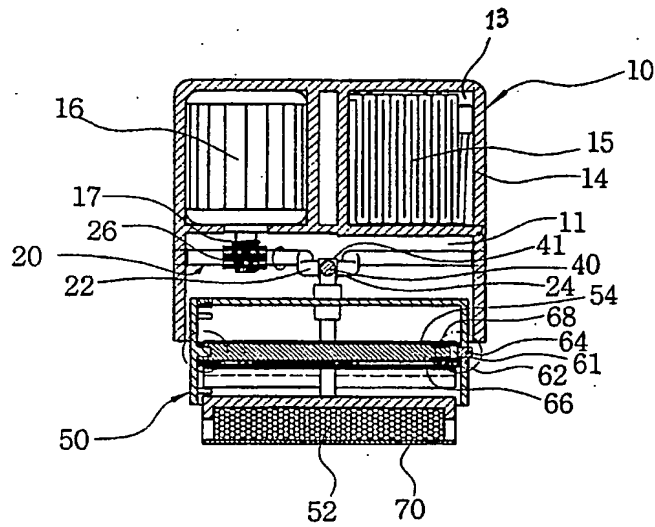


FIG. 4

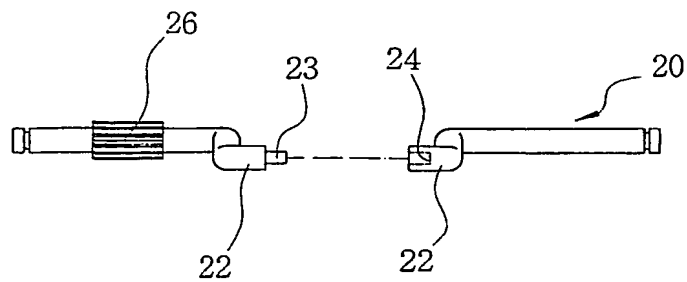


FIG. 5a

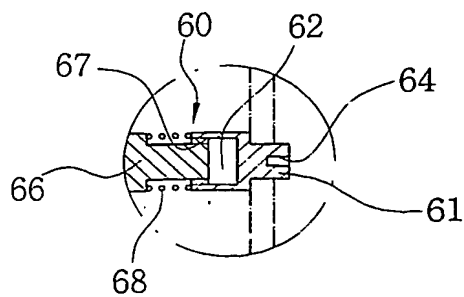


FIG. 5b

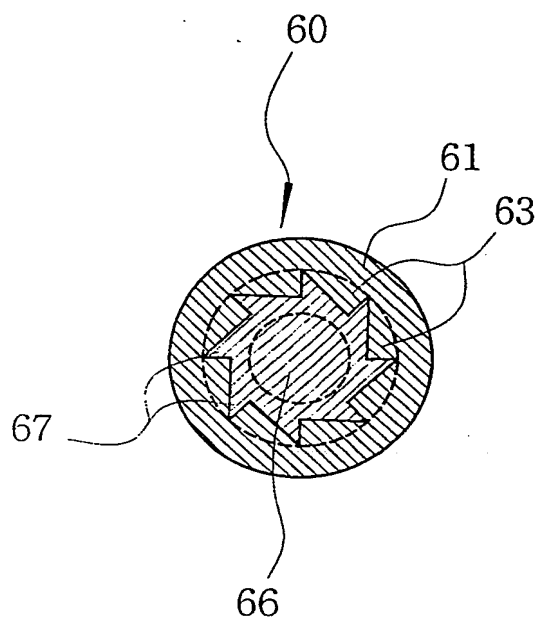


FIG. 6a

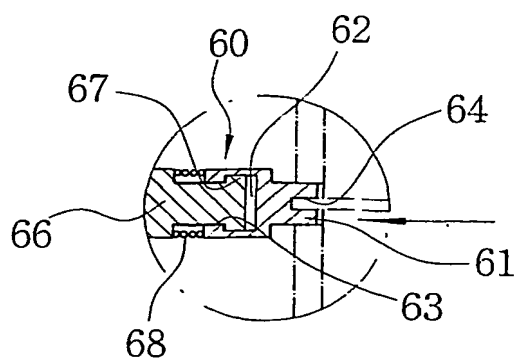


FIG. 6b

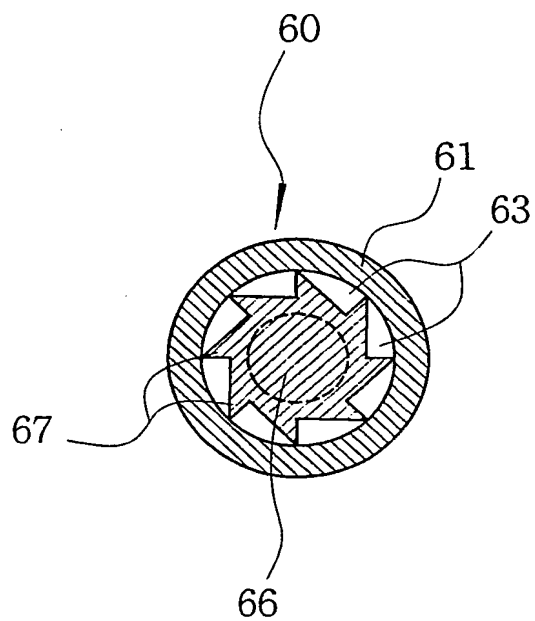


FIG. 7a

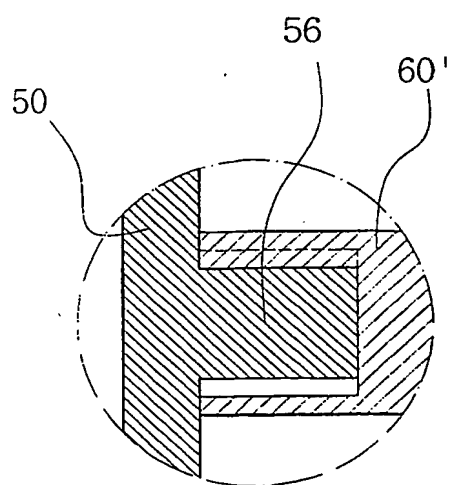
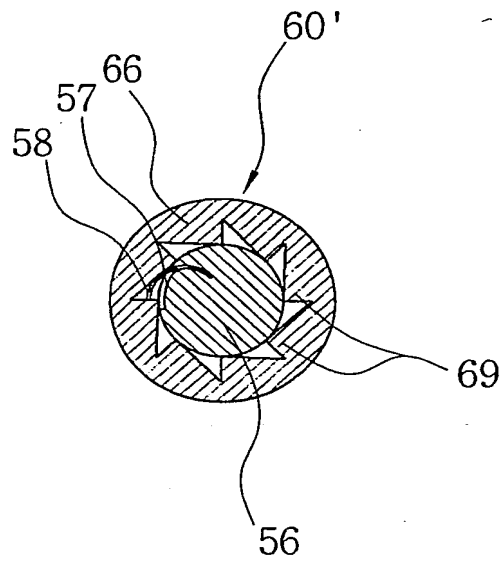


FIG. 7b



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR02/00916

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 B60S 3/06, A47L 11/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC B60S, A47L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

JP IPC as above

KR IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4,922,572 A (Albert Kohl) 8 May 1990 (Family none) Figure 1,8	1 - 3
A	US 4,380,092 A (Woodrow Brothers) 19 Apr 1983 (Family none) See the whole document	1 - 3.
A	US 3,972,088 A (Clarence Thomas) 3 Aug 1976 (Family none) See the whole document	1 - 3
A	JP 2-49623 A (HITACHI Corp.,) 20 Feb 1990 (Family none) Figure 1,2	1 - 3
A	JP 7-317 A (SAMSUNG ELECTRONIC Corp.,) 6 Jan 1995 (Family none) See the whole document	1 - 3
A	JP 5-253831 A (OTAWARA Unl.) 5 Oct 1993 (Family none) See the whole document	1 - 3
A	KR1997-0058625 A (SHARP Corp.,) 12 Aug 1997 (Family none) See the whole document	1 - 3
A	KR 80-1149 U (LEE,H K) 29 Jul 1980 (Family none) See the whole document	1 - 3



Further documents are listed in the continuation of Box C.



See patent family annex.

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